ATTACHMENT J.4.89

PACKAGING LOW-LEVEL RADIOACTIVE WASTE IN METAL BOXES

FOR SHIPMENT TO THE NEVADA TEST SITE

PT-0007

CONTROL NUMBER: EM-0007
SITE PROCEDURE PT-0007
REVISION NO. 4

PACKAGING LOW-LEVEL RADIOACTIVE WASTE (LLRW) IN METAL BOXES FOR SHIPMENT

PT-0007

Effective Date: 08/07/97

Originator (Subject Expert): S. Stierhoff — Date: 8/7/97

Checker Concurrence: J. Edney — Date: 8/7/97

Authorized By: M. West, Packaging and Transportation (PT) FAM — Date: 8/7/97

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Fluor Daniel Fernald, Inc.
P. O. Box 538704
Cincinnati, Ohio 45253-8704

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ATTACHMENTS

ISSUE AND REVISION SUMMARY

Revision	Date	Description of Issue or Revision
0	12-14-92	Separate procedure written for packaging LLRW in boxes per Request No. S92-176, initiated by M. Hundley. SSOP-0079, SSOP-0078, and SSOP-0075 replace SSOP-0024.
1	10-04-94	Major revision required to update tables, Figure 3, and organization names and add labeling requirement per Request No. S93-073, initiated by Lori Hurst. This revision supersedes SSOP-0079, dated 12-14-92, Rev. 0.
2	03-30-95	Major Revision to omit the labeling, marking, and inspecting sections; add requirements for top-loading boxes; add requirements for packaging regulated asbestos containing materials; and outline the latest responsibility changes per Request No. S94-174, initiated by B. Giessl. This document replaces SSOP-0079, dated 10-04-94, Rev. 1.
3	06-30-97	Minor revision to show the new process and incorporate ICPs; initiated by S. Stierhoff per WR-0358. This document supersedes PT-0007, dated 03-30-95, Rev. 2.
4	08/07/97	Major revision to incorporate IC97-052 and update Free Liquid Issue noted by the Nevada Test Site. This document supersedes PT-0007, dated 6-30-97, Rev. 3.

1.0 PURPOSE

This procedure provides the instructions for packaging low-level radioactive waste (LLRW) in metal boxes for shipment.

2.0 SCOPE

2.1 The procedure outlines the steps for (1) inspecting the waste to be packaged, (2) preparing empty boxes, (3) filling boxes with waste, (4) weighing filled boxes, and (5) securing the boxes.

2.2 The packaging operation is applicable to Fernald Environmental Management Project (FEMP) personnel (including subcontractors) responsible for packaging LLRW in metal boxes at any packaging location of the FEMP.

3.0 REFERENCES

3.1 EW-0001, Completing the Material Evaluation Form

3.2 EW-0006, Management of Excess Soil, Debris, and Waste from a Project

3.3 PT-0003, Control and Issuance of Empty Containers at the FEMP

3.4 PT-0011, Evaluating Low-level Radioactive Waste (LLRW) Bulk Waste Streams for Shipment

3.5 MCA-I-018, Completing the Item Production/Certification/Identification Form

3.6 QP-11.24, Real-time Radioscopic Examination

3.7 20-C-111, Transportation of Low Level Radioactive Waste and Nuclear Material

3.8 20-C-627, Liquid Removal from Containerized Low-level Radioactive Waste

3.9 20-C-630, Receipt Inspection and Placement of Hazardous, Mixed, PCB, and Asbestos Wastes into Storage

3.10 20-C-912, Checking Scale Operation

4.0 RESPONSIBILITIES

4.1 Packager inspects waste and containers and packages waste per this procedure. Complies with any additional requirements specified by Safety and Health (S&H).

4.2 Waste Characterization (WC) provides documentation supporting characterization of all LLRW packaged under this procedure.

4.3 Waste Tech ensures the box is empty and in acceptable condition before packaging. Ensures contents of waste package. Coordinates the movement of containers. Ensures that inventory to be packaged is waste. Verifies FS-F-3252, Material Evaluation Form (MEF), before packaging waste. Observes waste packaging.

4.4 Inventory Control provides bar code labels. Maintains records and inventory of metal boxes. Tracks movement of empty and full containers.

4.5 Safety and Health (S&H) provides a Radiological Control Technician (RCT), as requested. Determines appropriate respiratory equipment and any other employee protection.

4.6 Supervisor of the Waste Generation Area specifies applicable scale procedures and standard tare weight of packages. Ensures packaging materials are available for Packagers. Ensures that only trained personnel package waste material. Ensures that personnel who package waste for shipment follow applicable procedures. Contacts S&H to determine the appropriate respiratory protection for the process being performed and the radiological surveys required for materials moving in and out of contamination areas. Contacts Radiological Control (RC) for a Radiological Work Permit (RWP) or other safety permits and ensures permits are obtained and signed prior to performing work. Provides packagers with the required respiratory protection and other personal protective equipment (PPE). Ensures the lid on a box is secured after packaging so unknown materials are not added. Ensures waste packages are weather-protected. Contacts S&H prior to opening any container of unknown radioactive material.

4.7 Motor Vehicle Operator (MVO)/Heavy Equipment Operator (HEO) delivers empty boxes to designated packaging location. Supports Packager as needed per this procedure.

4.8 Waste Acceptance overviews packaging operation to ensure compliance with this procedure. Supports Quality Assurance in Real-time Radiography (RTR) operations.

4.9 Quality Assurance (QA) - Coordinates and performs RTR operations, surveillances, and audits of the packaging program.

5.0 GENERAL

5.1 For Waste Stream ONLO000000002 Contaminated Construction/Removal, the following substitutions should be made:

- WC may be performed using EW-0006, Management of Excess Soil, Debris, and Waste from a Project.
- A Packager could be a subcontractor or FEMP personnel.
- A Supervisor could be the Construction Management Team Representative if a project is subcontracted.

5.2 DOT label letters shall be 2 inches high by 1/4 inch wide.

5.3 Any circumstance that could have resulted in an intake of radioactive materials by inhalation, ingestion, or absorption shall be immediately reported to a supervisor. The supervisor shall immediately report the circumstance of possible radioactive materials intake to the S&H RC Department for evaluation. When the suspect isotope is uranium, the involved employees shall report to the Urine Sampling Station at the end of their respective shift to complete an FS-F-1458, Investigation Report (IR), and submit an incident urine sample. The involved employees shall also report to the Urine Sampling Station at the start of their next shift to submit a follow-up urine sample. When the suspect isotope is other than uranium, the involved employee(s) shall report to the Dosimetry Section of RC for further determination of actions. Employees are responsible for complying with appropriate requirements as specified by the authorized S&H staff.

6.0 PREREQUISITES

6.1 Safety glasses with side shields shall be worn unless other eye protection is specified.

6.2 Respiratory protection provided by the supervisor shall be worn when required.

6.3 Gloves shall be worn when handling boxes, operating equipment, and handling rough, sharp-edged, or contaminated material.

6.4 Neoprene rubber gloves shall be worn when handling hazardous chemical substances where skin contact is possible.

6.5 Vacuum cleaners with HEPA type filters or a current di-sec, octyl phthalate (DOP) test label properly affixed to vacuum shall be used for cleaning.

6.6 An RWP must be approved and current.

6.7 Face shields shall be worn when removing lids or bungs of containers filled with liquids or during operations where personnel could be splashed with liquids.

6.8 Access to the container storage area will be secured and the container will be labeled as required in procedure 20-C-630 when packaging Regulated Asbestos Containing Materials (RACMs).

6.9 An FS-F-3252, Material Evaluation Form (MEF), shall be initiated (per EW-0001) prior to filling container. WC will assign the material an MEF number before final characterization is complete, which occurs after sampling. Any waste acceptance criteria (WAC) for which compliance cannot be verified by Sampling and Analysis shall be addressed in the Task Order. Activities needed to bring the waste into WAC compliance (e.g., decant liquid, use additional absorbent, or packaging limitations) shall be described in the Task Order.

6.10 Employees shall be briefed on and sign the RWP in black ink before performing work.

6.11 Prohibited Materials list (Attachment A) shall be displayed in the packaging area or on the container.

6.12 Obtain the following materials and tools, as needed, before packaging:

- Absorbent pads
- Appropriate safety protective equipment
- Blue and white paint, as applicable
- Caulking
- Clean rags
- Crow and breaker bar
- Diatomaceous earth
- Electric drill
- Foam-strip gasket, if required (size appropriate for box)
- Hammer and screw driver, as applicable
- Impact wrench and sockets, as applicable
- Paint stick
- Plywood
- Sawsall
- Skids
- Tarpaulin
- Wrench and channel locks, as applicable

6.13 The FS-F-4178, Process Area Waste Checklist (Attachment B), shall be displayed in the packaging area or on the container when packaging Waste Stream ONLO000000001 process area scrap.

6.14 A minimum of two personnel are required to package waste.

6.15 Packagers shall be qualified in use of PPE.

7.0 PROCEDURE

7.1 INSPECTING BULK WASTE

Waste Tech

1. Ensure that WC has initiated an MEF.

   A. If the waste characterization has not been initiated, inform Supervisor to contact WC for disposition before continuing procedure.

   OR

   B. If the waste characterization has been initiated, package per this procedure.

2. Ensure the waste to be packaged is not on the Prohibited Materials list (Attachment A) and can pass either the Process Area Waste Checklist (Attachment B) or the FS-F-3472, Process Area Waste Vehicle Checklist (Attachment C), when applicable.

   A. If the waste is on the Prohibited Materials List or does not pass the Process Area Waste Checklist or the Process Area Waste Vehicle Checklist, notify supervisor or set aside for alternative disposition before continuing procedure.

   OR

   B. If the waste is not on the Prohibited Materials List and passes either the Process Area Waste Checklist or the Process Area Waste Vehicle Checklist, continue procedure.

      NOTE: The determination to package a waste stream is based on a completed MEF.

3. Visually check waste for free liquid (including ice).

   A. If free liquid is present, notify Supervisor for disposition before continuing procedure.

   OR

   B. If free liquid is not present, continue procedure.

7.2 INSPECTING DRUMMED WASTE

Waste Tech

1. Ensure that WC has initiated an MEF.

   A. If the waste characterization has been initiated, package per this procedure.

   OR

   B. If the waste characterization has not been initiated, inform Supervisor to contact WC for disposition before continuing procedure. Secure container pending resolution.

Packager

2. Ensure the waste type to be packaged is not on the Prohibited Materials list (Attachment A) and can pass the Process Area Waste Checklist (Attachment B).

   NOTE: Packaging waste listed on the Prohibited Materials list or that does not pass the Process Area Waste Checklist is not permitted.

   A. If waste type is not on the Prohibited Materials list and passes the Process Area Waste Checklist, continue procedure.

   OR

   B. If waste type is on the Prohibited Materials list or does not pass the Process Area Waste Checklist, notify Supervisor and set aside for alternative disposition before continuing procedure.

3. Visually check waste for free liquid (including ice).

   A. If free liquid is present, notify Supervisor to determine appropriate method for decanting free liquid, per procedure 20-C-627, before continuing procedure.

   OR

   B. If free liquid is not present, continue procedure.

7.3 PREPARING AN EMPTY, SMALL METAL BOX

Waste Tech

1. Request, obtain, and verify delivery and acceptability of approved containers for packaging per procedure PT-0003.

Supervisor

2. Specify the scale to be used for weighing empty metal boxes.

3. Specify the method of transporting box to the scale.

4. Ensure that the scale is correctly calibrated.

Packager

5. Inspect and perform scale check per procedure 20-C-912.

MVO/HEO

6. As directed, move the box onto the scale.

   NOTE: MVO may move any container within the capacity of a forklift; HEO shall move anything greater than the capacity of a forklift.

Packager

7. Tare weigh box.

8. Record the tare weight of the box on the upper center of the box with indelible ink or paint so that it can be covered by the bar code (see Attachment D).

   NOTE: Plastic bags are used to hold 65 cards (on which the tare weight is recorded) on side of containers.

MVO/HEO

9. Remove the box from the scale.

10. Remove lid and place in a designated location to prevent damage.

Packager

11. Determine if the waste form has the potential for damaging the container (i.e., dents and/or punctures) during loading. If yes, provide protection to the container bottom before loading waste.

    NOTE: Packaging protection is required when loading broken concrete or large pieces of metal or equipment with sharp edges that could puncture the container bottom. Package protection is not required when loading less dense materials such as soil, wood, stabilized waste, or drummed materials.

    NOTE: Package protection can be achieved by using soft material such as wood pallets or plywood to cushion the waste from coming in contact with and damaging the container floor.

12. Place, at minimum, one layer of absorbent pads per box.

    NOTE: When packaging material with a high moisture content (e.g., sump cakes), additional absorbent material is required. The amount of absorbent will be based on the potential free liquid in the waste.

13. The amount of absorbent to add is shown in (Table 4) based on the material description code of the waste (Table 2), free liquids risk (Table 3) and weight of the waste and the type of absorbent being added (Table 4).

7.4 PREPARING AN EMPTY, TOP-LOADING METAL BOX

Waste Tech

1. Request, obtain, and verify delivery and acceptability of approved containers for packaging per PT-0003.

Packager

2. Do one of the following, depending on container code of the box:

   A. If preparing a box (Top Loading ISO/Container Code 133), perform the following steps to complete container preparation before continuing procedure:

      (1) Spread two layers of absorbent pad on container floor, permitting no gaps and allowing padding to extend a minimum of three inches upward along each wall.

      (2) Place one layer of pallets or plywood in the bottom of the box.

      (3) Caulk (silicone) door frame interior and inside edges of each door.

      (4) Close and latch doors, ensuring all latching mechanisms are engaged.

      (5) Band doors securely together with 1¼ inch bands, placed by the rail supports at mid-height of the container.

      (6) Caulk doors on the inside of the container (both sides) about two feet from the bottom.

   OR

   B. If preparing a box (other than Top Loading ISO/Container Code 133), continue procedure.

3. Place one layer of pallets (or its equivalent with concurrence by Waste Tech and Supervisor) in the bottom of the box. (These materials are needed to prevent damage to the bottom and are dependent on the waste to be packaged and the method of packaging).

Supervisor

4. Notify Waste Acceptance that the container has been prepared.

Waste Acceptance

5. Inspect container preparation for compliance per applicable department procedure.

7.5 FILLING THE BOX WITH BULK WASTE MATERIAL

Waste Tech

1. Maintain communication with Waste Acceptance to permit them to survey and document filling of boxes.

Packager

WARNING

IF SPECIFIED IN THE RADIATION WORK PERMIT (RWP), RESPIRATOR AND OTHER PERSONAL PROTECTIVE EQUIPMENT (PROVIDED BY THE SUPERVISOR) SHALL BE DONNED PRIOR TO FILLING CONTAINERS TO PREVENT INHALATIONS AND EXPOSURES.

NOTE: Any waste encountered in the packaging operation not covered by the MEF or that does not meet either the Process Area Waste Checklist or the Process Area Waste Vehicle Checklist requirements shall be set aside and shall not be packaged without the Supervisor contacting WC for disposition instructions.

NOTE: Property that has bar code labels must be accompanied by an FS-F-0563, Property Disposal Request, or a letter approving them for disposition. (Items should be listed on the FS-F-4879, Material Packaging List.)

NOTE: Large items shall be carefully loaded to minimize damage, settling, and shifting during transportation.

2. Load waste into box as tightly as possible, ensuring the box is within specified weight limitations (see Table 1) and the load is balanced to prevent tipping.

3. If filling and securing of box is not completed by end of work shift, do the following:

   A. Place tarpaulin over box opening and secure.

   B. At beginning of next work shift, remove tarpaulin and continue procedure.

4. Using a clean rag, wipe top edge of box and place rag in the box.

5. Peel protective paper from foam-strip gasket and carefully apply gasket to box edge and/or the underside channel of the lid.

6. Place lid on box and secure as directed by Supervisor.

7. Complete an FS-F-4879, Material Packaging List (Attachment E).

Waste Tech

8. Complete either a Process Area Waste Vehicle Checklist (Attachment C) or a Process Area Waste Checklist (Attachment B), as applicable, per PT-0011.

9. Initiate an FS-F-1945-1, Item Production/ Certification/Identification, 65 Card (Attachment F), for each box per MCA-I-018, Completing the Item Production/Certification/Identification Form.

10. Apply tamper indicating device (TID) on container around both flanges of the lid and box, ensuring each TID is properly locked.

11. Record TID numbers in the Seal Number section of the 65 Card.

Packager

12. Notify supervisor (or HEO for topload boxes) that the box is ready to be weighed.

7.6 FILLING THE BOX WITH DRUMMED WASTE

NOTE: For Waste Stream ONLO000000006 only residues assigned to the same Material Evaluation Form (MEF) will be packaged together in a single container for shipment.

Packager

1. Lower the drummed container into the box and remove the lifting device.

2. Load box with drummed containers as tightly as possible, ensuring the box is within specified weight limitations (see Table 1) and the load is balanced.

3. Using a drum turner within the enclosure. invert drum and fill void space in top portion of each container.

4. If necessary, manually remove small pieces of debris from inverted drum and place inside containers.

5. When inverted drum is empty, remove from enclosure.

6. Load box as tightly as possible, ensuring the box is within specified weight limitations (see Table 1) and the load is balanced.

7. If filling and securing of box is not completed by end of work shift, do the following:

   A. Place tarpaulin over box opening and secure.

   B. At beginning of next work shift, remove tarpaulin and continue procedure.

8. Perform steps 4 through 11 of Section 7.5 of this procedure.

9. Complete the FS-F-4337 , Drum Overpack/Repack Worksheet (Attachment G).

Waste Tech

10. Review the FS-F-4337 for completeness.

11. Forward FS-F-4337 to Inventory Control.

7.7 WEIGHING THE FILLED BOX

Supervisor

1. Specify the scale and the method of transporting the box to the scale.

Packager

2. Inspect and perform scale check per 20-C-912.

MVO/HEO

NOTE: An MVO may move any container within the capacity of a forklift; an HEO shall move anything greater than the capacity of a forklift.

3. Move the box onto the scale.

Packager

4. Weigh the box including box pins and other hardware to obtain gross weight.

NOTE: Repackaging or removal of material from the overweight container is the preferred disposition option to maintain compliance with safe lifting limits for standard forktrucks. If repackaging of material is not feasible or impacts the FEMP "as low as reasonably achievable" (ALARA) concept, the supervisor may use specialized equipment (i.e., forktrucks with rated capacities in excess of 9000 pounds) to move the box. The overweight container may also be overpacked within an ISO container, provided that waste stream material compatibility is maintained for the overpack container. In addition, the supervisor can initiate a Task Order that provides a safe, alternative method of managing the overweight container.

A. If the box is over the specified weight limit (see Table 1), notify supervisor for disposition.

OR

B. If the box is within weight limit, continue procedure.

5. Fill out weight ticket.

6. Transmit weight ticket to Waste Tech and Inventory Control.

7. Record the tare and gross weight on the 65 Card.

NOTE: Tare weight for the large top-loaders is marked in the top corner of the box.

8. Record gross weight and serial number with indelible ink on upper corner of the box.

9. Sign 65 Card.

MVO/HEO

10. Remove box from scale to storage or staging area as specified by the Supervisor.

Packager

11. Complete a waste movement record per 20-C-111.

12. Submit the waste movement record, 65 Card, and any applicable form(s) to Supervisor.

Supervisor

13. Sign 65 Card indicating accuracy and completeness.

14. Complete and sign the other appropriate form(s).

15. Ensure movements records are completed and submitted to Inventory Control for entry into the Sitewide Waste Information, Forecasting, and Tracking System (SWIFTS) per 20-C-111.

16. Forward 65 Card and the appropriate form(s) to Waste Tech.

Waste Tech

17. Review, initial, date, and distribute the 65 Card, Material Packaging List, and the appropriate Checklist to Inventory Control and WC.

Inventory Control

18. Print required bar code labels and submit to Packager.

Waste Tech

19. Send one box in the shipment (selected by QA or Waste Acceptance) for real-time radiography (RTR).

Quality Assurance (QA)/Waste Acceptance

20. Check designated boxes for prohibited items and free liquid per QP-11.24.

7.8 CHECKING REWORK BOXES FOR PROHIBITED ITEMS/FREE LIQUID

Packager

1. Remove TIDs on box.

2. Remove lid on box.

3. Check metal box for prohibited items (e.g., unpunctured spray cans) and free liquid (e.g., water).

4. Do one of the following:

   A. If a prohibited item is in the box, remove it.

   OR

B. If free liquid is in the box, either add absorbent or decant per 20-C-627. (low-level waste shall contain as little free liquid as is reasonably achievable, but in no case shall the liquid equal or exceed 0.5 percent by volume of the external waste container.)

Waste Tech

5. Secure box per steps 4 through 6 of Section 7.5 of this procedure and apply a new TID.

6. Record new TID numbers in the Seal Number section of 65 Card.

Packager

7. If significant amount of material is removed, reweigh box per Section 7.7 of this procedure and record weight adjustments on 65 Card and Weight Ticket.

8. Send reworked box back to QA/Waste Acceptance for RTR.

Quality Assurance (QA)/Waste Acceptance

9. Send a copy of the RTR Report to Waste Tech for shipment file.

8.0 RECORDS

The following documents will be generated as records as a result of this procedure and will be managed according to RM-0022, FEMP Records Management Program/Records Management User Manual:

- FS-F-4178, Process Area Waste Checklist
- FS-F-3472, Process Area Waste Vehicle Checklist
- FS-F-4879, Material Packaging List
- FS-F-1945-1, Item Production/Certification/Identification
- FS-F-4337, Drum Overpack/Repack Worksheet
- Weight Tickets

9.0 DRIVERS

9.1 NTSWAC, Nevada Test Site Defense Waste Acceptance Criteria

9.2 49 CFR, Section 173

9.3 RM-0012, Quality Assurance Program

10.0 DEFINITIONS

10.1 Free Liquid - Any free flowing liquid or liquid that readily separates from the solid portion of a waste under ambient temperature and pressure conditions. Ice is also considered a free liquid.

10.2 Low-Level Radioactive Waste (LLRW) - All radioactive waste not classified as high-level waste, spent nuclear fuel, Transuranic (TRU) waste, uranium mill tailings, or Mixed Waste (MW).

10.3 Resource Conservation and Recovery Act (RCRA) - The Congressional Act that established safe and environmentally acceptable management practices for specific wastes. RCRA requires strict "cradle to grave" control, documentation, and proper management of hazardous wastes.

10.4 Rework - A waste container status indicator that means that a condition exists that doesn't allow this container to meet project specified acceptance criteria. Note: This is not necessarily a nonconforming condition if inspection is performed "For Information Only."

10.5 White Metal Boxes (WMB) - Bulk containers with a net capacity greater than 452 liters and less than 3,000 liters that meet HM-181 test standards. (See Table 1 for specification of each type.)

TABLE 1 - WEIGHT LIMITATIONS

NTS CONTAINER CODE	SHIPPING CONTAINERS	TARE WT (LBS)	WT LIMIT (LBS)
104	WMB (CGR) Half-height Box No. C-95-100 REVA 2'H x 4'W x 7'L Exterior 20"H x 46"W x 82"L Interior	693	9000
107	WMB (CGR) Full-height Box No. C-95-100 REVA 4'H x 4'W x 7'L Exterior 44"H x 46"W x 82"L Interior	909	9000
113	WMB - Pin Type No. 30A-5500-M-00059, Rev. 0 43"H x 53"W x 77"L Exterior 38"H x 52"W x 76"L Interior	630	6000 or no more than 3" freeboard
117	WMB - Clip Type Electropanel No. 89DW000800, Rev. 1 41"H x 54"W x 78"L Exterior 37"H x 48"W x 72"L Interior	680	6000 or no more than 3" freeboard
117	WMB - Bolt Type (Carolina) No. PT-188-93 42"H x 55"W x 80"L Exterior 37"H x 50"W x 75"L Interior	"900	9000 or no more than 3" freeboard
117	WMB - Bolt Type (Galbreath) No. 151503 41-13/16"H x 55.5"W x 80"L Exterior 37"H x 51.5"W x 74.5"L Interior	"900	9000 or no more than 3" freeboard
119	WMB - Bolt Type No. C01-542-2-01 40.5"H x 57.25"W x 81.25"L Exterior 32"H x 52"W x 76"L Interior	850	9000 or no more than 3" freeboard
120	Top Load No. 40X-5500-M-00041, Rev. 1 89"H x 96"W x 240"L Exterior	VARIED	42,000 or full
121	Top Load No. 94"H x 96"W x 240"L Exterior 88"H x 92"W x 236"L Interior	VARIED	42,000 or full
130	WMP - Seal Loc Clips (Container Products) No. 4371092/4426927 42.5"H x 53"W x 79.25"L Exterior 38"H x 52"W x 76"L Interior	720	9000 or no more than 3" freeboard
131	Metal Box - Bolt Type (Thorium Overpack) Drawing C-150-F 45.5"H x 55.55"W x 83"L Exterior 41"H x 52"W x 79"L Interior	"900	9000
132	Metal Box - Supercompactor Drawing SUP-50001-A 52.5"H x 46.75"W x 74"L Exterior 47.07"H x 42.25"W x 69.5"L Interior	1360	9000
133	Top Load Container 108"H x 96"W x 238"L Exterior 88"H x 94"W x 232"L Interior	Varied	42,000

TABLE 2 - FREE LIQUIDS POTENTIAL CLASSIFICATION BY MATERIAL DESCRIPTION CODE

No Potential	Low Potential	Medium Potential	High Potential
MDC 004	MDC 003 MDC 005	MDC 011	MDC 001
MDC 055	MDC 008 MDC 017	MDC 026	MDC 002
MDC 056	MDC 024 MDC 025	MDC 042	MDC 007
MDC 081	MDC 027 MDC 029	MDC 099	MDC 012
MDC 119	MDC 030 MDC 033		MDC 018
MDC 222	MDC 034 MDC 035		MDC 020
MDC 223	MDC 036 MDC 037		MDC 021
MDC 227	MDC 038 MDC 047		MDC 026
MDC 234	MDC 049 MDC 058		MDC 039
MDC 308	MDC 060 MDC 061		MDC 041
	MDC 062 MDC 065		MDC 042
	MDC 066 MDC 070		MDC 043
	MDC 076 MDC 077		MDC 046
	MDC 082 MDC 084		MDC 054
	MDC 085 MDC 088		MDC 067
	MDC 100 MDC 101		MDC 068
	MDC 104 MDC 122		MDC 069
	MDC 125 MDC 129		MDC 091
	MDC 132 MDC 134		MDC 092
	MDC 137 MDC 143		MDC 170
	MDC 157 MDC 159		
	MDC 163 MDC 165		
	MDC 166 MDC 167		

NOTE: Potential for free liquid potential is based on physical characteristics at time of generation. Free liquids may be observed in containers with no, low, or medium potential materials due to previous storage on outdoor pads. If free liquids are observed, or if you are working with a Material Description Code not listed above, contact your supervisor for corrective action.

TABLE 3 - FREE LIQUIDS RISK

MEF#	Free Liquids Risk	MEF#	Free Liquids Risk	MEF#	Free Liquids Risk	MEF#	Free Liquids Risk	MEF #	Free Liquids Risk
205	High	20008	High	30024	Medium	50106	Low	50344	Low
283	Medium	20009	High	30026	Medium	50107	Low	50348	Low
283	Medium	20014	High	30028	Low	50110	Low	50368	Low
580	Medium	20016	Medium	30030	High	50130	Low	50369	Low
830	Medium	20017	High	30035	High	50135	Low	50371	Low
901	Low	20023	Medium	30044	low	50137	Low	50372	Low
1088	Low	20025	High	30049	High	50144	Low	50374	Low
1099	Low	20026	Low	30051	Low	50149	Low	50376	Low
1244	Low	20034	Low	30052	Low	50150	Low	50377	Low
1260	High	20056	High	30054	Medium	50152	Low	50380	High
1284	Low	20059	Low	30056	High	50154	Low	50381	Low
1329	Medium	20063	Low	30058	low	50155	Low	50382	Low
1335	High	20064	None	30061	low	50156	Low	50383	Low
1346	Low	20067	None	30063	low	50163	Low	50386	Low
1349	Low	20072	None	30064	low	50167	High	50397	High
1401	Low	20073	Low	30068	High	50176	Low	50409	Low
1431	Low	20075	Low	30069	High	50181	Low	50411	Low
1453	High	20077	Low	30071	Low	50194	Low	50414	Low
1455	Low	20079	None	30072	Low	50196	None	60031	Medium
1532	High	20080	None	30077	Low	50206	Low	60088	High
1766	Medium	20081	None	30083	Medium	50212	Low	60091	High
1767	High	20082	Low	40207	Low	50214	Low	60109	Low
1859	Medium	20084	Low	50005	High	50215	Low	60111	High
1915	Low	20090	None	50006	High	50216	Low	60142	Low
1918	Medium	20091	Medium	50007	High	50229	Low	60144	Low
1929	Low	20098	Low	50009	High	50236	Low	60145	Low
1959	Low	20102	Low	50023	Low	50240	Low	60146	Low
1963	Medium	20108	Low	50024	Low	50241	Low	60154	Low
1964	High	20111	None	50030	Low	50245	Low	60164	Low
2075	Low	20122	None	50033	Low	50247	Low	60168	Low
2185	Low	20128	Low	50034	Low	50254	Low	60173	Low
2212	High	20135	Low	50050	Low	50265	None	60176	High
2223	Medium	20136	None	50057	Low	50269	Low	60184	Low
2262	Low	20137	None	50064	Low	50280	Low	60213	None
2426	Low	20151	Medium	50065	Low	50282	Low	60217	None
2427	Low	30001	High	50067	Low	50296	Low	60222	None
2462	Low	30002	Low	50077	Low	50299	Low	60243	None
2601	High	30003	Low	50080	Low	50300	Low	60268	None
2602	High	30004	Low	50082	Low	50310	Low	60308	High
2661	None	30008	Low	50086	High	50312	Low	60309	High
2663	Low	30013	Low	50088	High	50313	Low	60311	Low
2735	High	30015	Low	50092	Low	50314	Low	60312	None
2742	High	30016	Low	50097	Medium	50316	None	60314	Low
2884	High	30017	High	50101	High	50319	Low	60316	Low
10001	Low	30018	High	50104	High	50322	Low	60341	Low
20001	Low	30023	High	50105	High	50323	Low	60468	High

TABLE 4 - VOLUME OF ABSORBENT MATERIALS NEEDED (IN QUARTS) BASED UPON FREE LIQUID POTENTIAL AND NET WEIGHT OF WASTE

Free Liquid Potential	Low Potential			Medium Potential			High Potential		
Net Weight of Waste (pounds)	Di.	RS	WW	Di.	RS	WW	Di.	RS	WW
250	0	0	0	1	1	1	3	2	2
500	0	0	0	2	2	2	6	5	4
750	1	0	0	4	3	2	9	7	6
1000	1	1	1	5	4	3	12	9	8
1500	1	1	1	7	6	5	18	14	11
2000	2	1	1	10	8	6	23	19	15
2500	2	2	1	12	10	8	29	23	19
3000	2	2	2	15	12	9	35	28	23
3500	3	2	2	17	14	11	41	33	26
4000	3	3	2	19	16	12	47	38	30
4500	4	3	2	22	18	14	53	42	34
5000	4	3	3	24	19	16	59	47	38
5500	4	4	3	27	21	17	64	52	41
6000	5	4	3	29	23	19	70	56	45
6500	5	4	3	32	25	20	76	61	49
7000	6	5	4	34	27	22	82	66	53
7500	6	5	4	36	29	23	88	70	56
8000	7	5	4	39	31	25	94	75	60

NOTES:

Di. = Dicalite
RS = RadSorb
WW = Water Works

1. Assumes a mass/volume factor of 2 pounds absorbent material per quart container for Dicalite (or equivalent).

2. Assumes a mass/volume factor of 0.5 pounds absorbent material per quart for RadSorb and Water Works (or equivalent).

ATTACHMENT A - PROHIBITED MATERIALS

PACKAGING GUIDELINES FOR WASTE GENERATOR	
Package has been properly prepared for closing when the following conditions exist:	
No liquids of any kind have been placed in container.	
Heavy/bulky items have been secured within container.	
All available space has been utilized efficiently.	
Prohibited materials (listed below) have been excluded.	
Packaging has not been damaged during loading.	
Liner is in place and properly lapped and sealed.	
PROHIBITED MATERIALS AND EXAMPLES	
Compressed Gases	***Corrosive Materials***
unpunctured aerosol cans	*acid or caustic material*
gas cylinders with valves or plugs in place	*acidic*
Free Liquids	***Hazardous Waste***
water, ice, seepage, condensation,	*solvents, petroleum products,*
drinks, coffee, juices, pop, soaked rags,	*lead, mercury, batteries,*
fuel, oil, fluids, solvents, etc.	*pesticides, etc.*
Etiologic Agents	***Explosives***
medical waste	

ATTACHMENT B - PROCESS AREA WASTE CHECKLIST

Reference MEF # 270

LOW-LEVEL RADIOACTIVE WASTE PROCESS AREA WASTE CHECKLIST

S

SECTION I - GENERAL CONTAINER INFORMATION

1. PLEASE IDENTIFY THE TYPES OF WASTE IN THE CONTAINER:

☐ Scrap Metal ☐ Electrical Equipment
☐ Scrap Wood ☐ Glass
☐ Paper/Plastic/Rubber/Cardboard/Canvas/Rope

* IF OTHER THAN THE ABOVE ITEMS ARE IN THE CONTAINER PLEASE DESCRIBE THE ADDITIONAL WASTE AND THE PLACE OF GENERATION OF THE WASTE.

A

SECTION II - GENERAL RESTRICTIONS	YES	NO
1. ARE THERE FREE LIQUIDS IN THE CONTAINER/WASTE MATERIAL?		
2. DID THE WASTE ORIGINATE FROM A RADIOLOGICALLY CONTROLLED AREA?		
3. IS THE WASTE A KNOWN HAZARDOUS WASTE?		
4. DID THIS WASTE ORIGINATE FROM A HAZARDOUS WASTE MANAGEMENT UNIT?		
ARE ALL SURFACE AREAS VISIBLE? IF NOT, WHAT WAS THE MATERIAL USED FOR AND WHAT DID IT CONTAIN? _____		
6. ARE THERE EXCESS RESIDUES? IF YES, ANSWER QUESTION 7.		
7. COULD THE EXCESS RESIDUES BE REMOVED AND MANAGED SEPARATELY? IF NO, DESCRIBE THE RESIDUE AND WHERE IT ORIGINATED FROM.		

M

P

SECTION III - APPROVED WASTE CRITERIA	YES	NO
1. SCRAP METAL - IS THE WASTE ONE OF THE FOLLOWING: STEEL (INCLUDING STAINLESS), COPPER, ALUMINUM, IRON, BRASS, NICKEL, MONEL, TIN?		
2. SCRAP WOOD - IS THE WOOD NON-PRESSURE TREATED?		
3. PAPER/PLASTIC/RUBBER/CARDBOARD/CANVAS/ROPE - IS THE WASTE ONE OF THE FOLLOWING: PACKING PAPER, PACKING MATERIALS, NEWSPRINT, OFFICE PAPER OR PROTECTIVE CLOTHING GENERATED AT THE PACKAGING/INSPECTION SITE OR ANY TYPE OF PLASTIC , CANVAS OR ROPE?		
4. ELECTRICAL EQUIPMENT - IS THE WASTE ONE OF THE FOLLOWING: NON-ASBESTOS WIRING, CONDUIT, NON-MERCURY SWITCHES OR DRY-TYPE TRANSFORMERS?		
5. GLASS - IS THE WASTE ONE OF THE FOLLOWING: EMPTY GLASS CONTAINERS, INCANDESCENT LIGHT BULBS, WINDOW OR SIGHT GLASS, OR BROKEN GLASS FROM THESE SAME ITEMS?		

L

SECTION IV - CONTAINER INFORMATION

1. SPECIFIC DISCERNIBLE ITEMS APPROVED AS LLRW (NON-RCRA) BY WASTE CHARACTERIZATION SECTION: _____

_____
WASTE CHARACTERIZATION SIGNATURE _____ DATE

E

2. Packaging Date:	3. Inches Freeboard/Headspace:	4. Container Serial Number:
5. Container Inventory Number:	6. Container Type: ☐ S/L ☐ WMB ☐ DRUM ☐ OTHER, Specify:	

7. Approved By: _____ (Supervisor Signature/Date)

Accepted By: _____ (WMM Signature/Date)

1	White	Waste Characterization	3	Yellow	Materials Control and Accountability
2	Blue	Low-Level Waste Handling and Disposal	4	Green	Waste Generator

ATTACHMENT C - PROCESS AREA WASTE VEHICLE CHECKLIST

Reference MEF # 123

LOW-LEVEL RADIOACTIVE WASTE
PROCESS AREA WASTE VEHICLE CHECKLIST

SECTION I

WASTE EVALUATION	YES	NO	N/A
1. Free from the following fluids: a. Anti-freeze			
b. Brake fluid			
c. Gasoline			
d. Engine oil			
e. Power steering			
g. Differential fluid (rear end)			
h. Windshield Wiper Fluid			
2. Removed: a. Radios			
b. Distributor coils and amplifiers			
c. Alternators			
d. Electronic fuel injector circuit			
3. Fuel tank removed			
4. Propane tank removed			
5. Tires Deflated			
6. Tire valve stem removed			
7. Freon pumped/contained for recycling			
8. Auxiliary Hydraulic Unit removed or drained			
9. Oil filter and Gas filter removed and filter receptacles on engine sealed			
10. Batteries removed			
11. All Hoses that contain liquids have been cut and Drained			

SECTION II - CONTAINER INFORMATION

1. MATERIAL ORIGIN/DESCRIPTION (Provide a detailed description of the materials in the container, including source or origin if available):

2. Packaging Start Date:	3. Packaging End Date:	4. Inches Freeboard/Headspace:
5. Container Inventory Number:	6. Container Type: ☐ S/L ☐ WMB ☐ DRUM ☐ OTHER, Specify:	

7. Approved By: _____ (Supervisor Signature/Date)

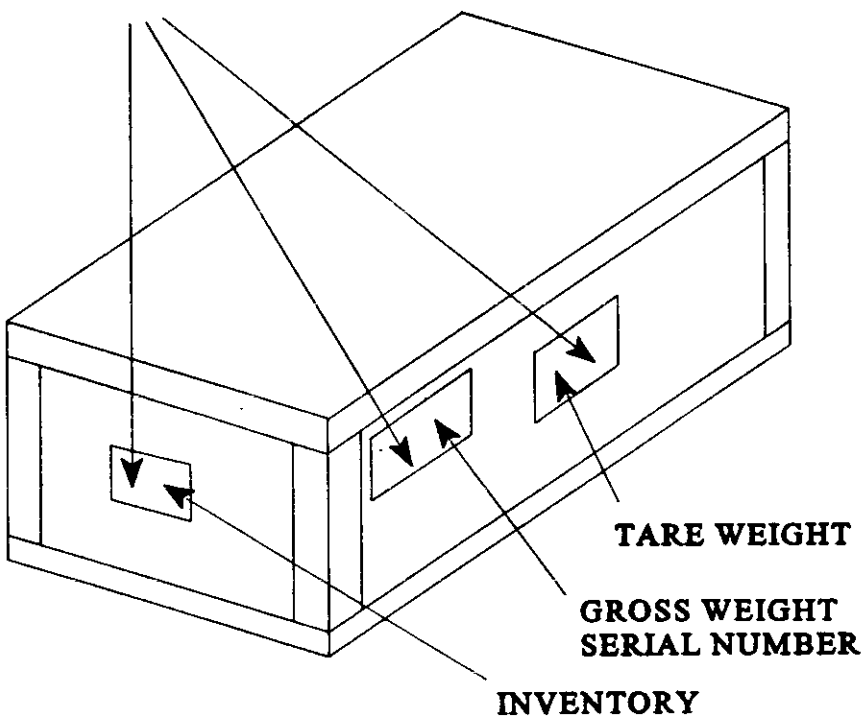
Accepted By: _____ WPM Signature/Date

1	*White*	Waste Characterization	3	*Yellow*	Material Control and Accountability
2	*Blue*	Low-Level Waste Handling and Disposal	4	*Green*	Waste Generator

FS-F-3472 (REV. 08/30/95)

ATTACHMENT D - LLRW BOX LABELING

PAINT PEN MARKING LOCATIONS



ATTACHMENT E - MATERIAL PACKAGING LIST

MATERIAL PACKAGING LIST

PACKAGING LOCATION _____ Date Filled _____

SERIAL NO. _____

INVENTORY NO. _____

TARE WEIGHT _____

RUST? YES _____ NO _____

HOLES? YES _____ NO _____

CONTAINER TYPE DRUM _____ WMB _____ ISO _____ TL _____

PROHIBITED ITEMS YES _____ NO _____

CONTENTS

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ARE CONTENTS DRY? _____ WET? _____ DAMP? _____

GENERATORS _____ BADGE # _____

WASTE ACCEPTANCE PREP CHECK YES _____ NO _____

DATE _____

_____ _____

_____ _____

MINIMUM OF VOID SPACE YES _____ NO _____

ATTACHMENT E - MATERIAL PACKAGING LIST (cont.)

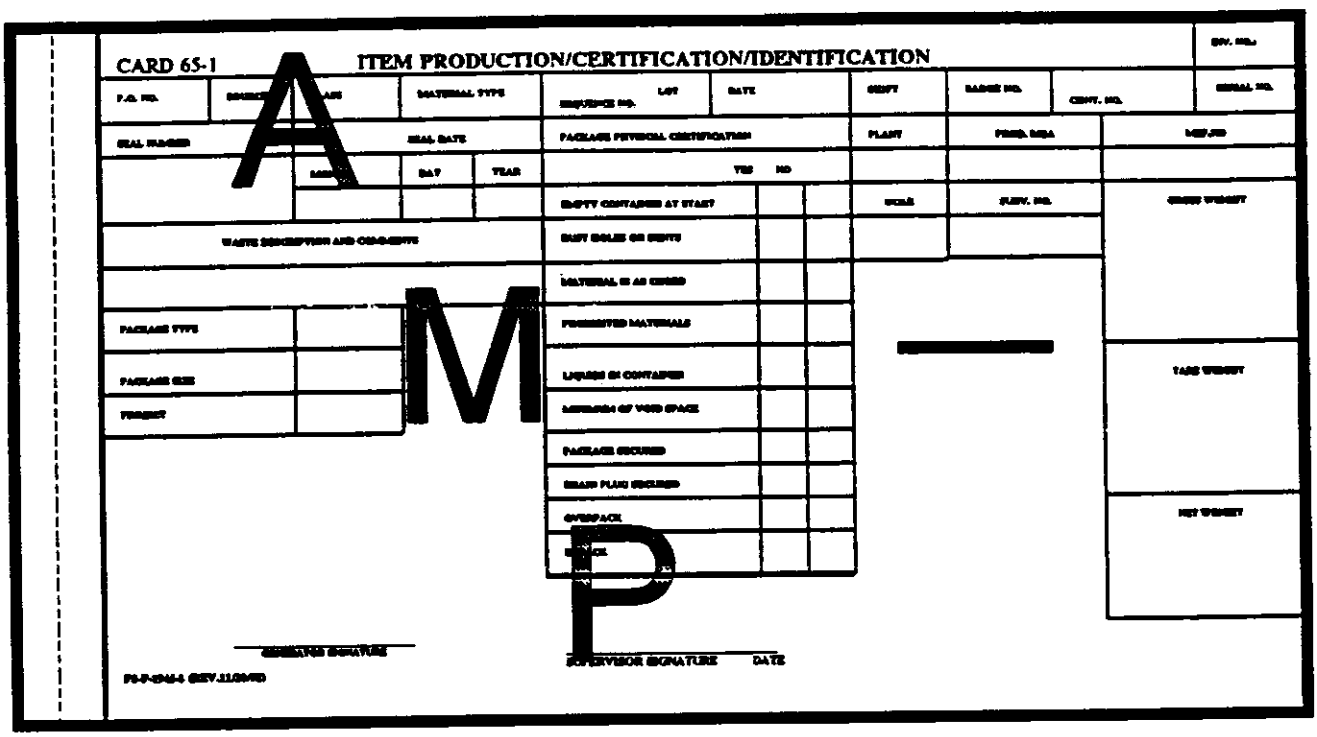
MATERIAL PACKAGING LIST

Instructions

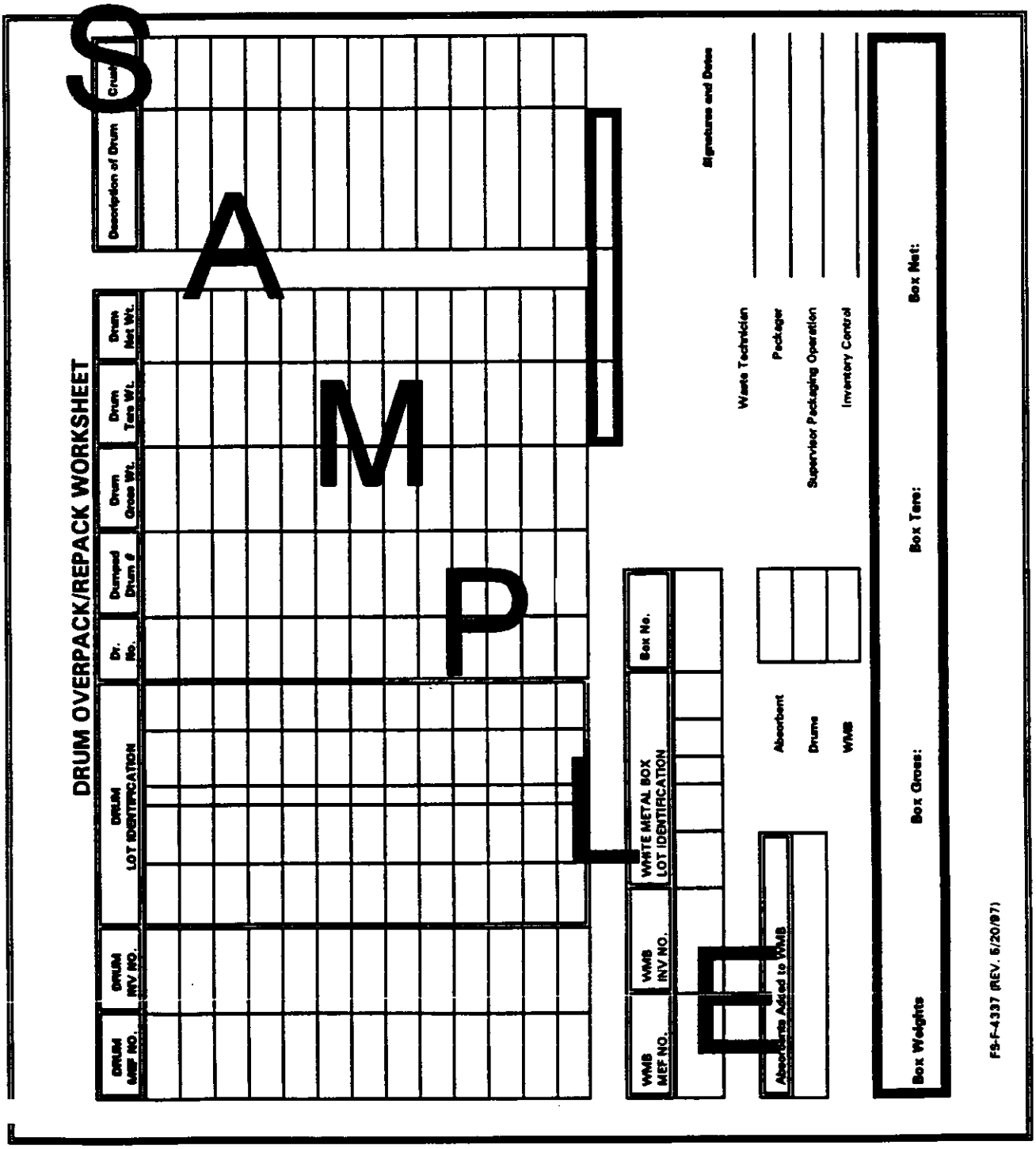
The following instructions are to be followed when filling out the Material Packaging List:

1. Fill in packaging location, serial number, inventory number, and tare weight.
2. Perform a physical check of the container check for holes and rust and mark accordingly.
3. Mark the container type.
4. As the container is being filled, list all items being loaded into container. Be as specific as possible when filling in contents. Ensure no prohibited items.
5. Check if contents of container is "dry," "wet," or "damp" when loaded.
6. Sign after container is completely loaded.
7. Waste Acceptance to check "yes" or "no" in the area for prep check and date as such.
8. Mark minimum of void space "yes" or "no"

ATTACHMENT F - ITEM PRODUCTION/CERTIFICATION/IDENTIFICATION



ATTACHMENT G - DRUM OVERPACK/REPACK WORKSHEET



ATTACHMENT G - DRUM OVERPACK/REPACK WORKSHEET (cont.)

DRUM OVERPACK/REPACK WORKSHEET

Instructions

The following instructions are to be followed when filling out the Drum Overpack/Repack Worksheet.

1. Fill in Serial Number, Inventory Number, and tare weight of the White Metal Box (Do not include the weight of the absorbent).
2. When overpacking drums, record the inventory number, lot number, drum number, and net weight.
3. When dumping (repacking), follow same steps as above, except record drum number in dumped drum number column.
4. When putting crushed empty drums from repacks into box, (✓) check the crushed column and list size of drum in description of drum column.
5. Sign and date sheet.